



## RADIOISOTOPE BRIEF

### Cobalt-60 (Co-60)

**Half-life:** 5.27 years

**Mode of decay:** Beta particles and gamma radiation

**Chemical properties:** Metallic solid that can become magnetically charged

#### What is it used for?

Co-60 is used medically for radiation therapy as implants and an external source of radiation exposure. It is used industrially in leveling gauges and to x-ray welding seams and other structural elements to detect flaws. Co-60 also is used for food irradiation, a sterilization process.

#### Where does it come from?

Nonradioactive cobalt occurs naturally in various minerals and has long been used as a blue coloring agent for ceramic and glass. Radioactive Co-60 is produced commercially through linear acceleration for use in medicine and industry. Co-60 also is a byproduct of nuclear reactor operations, when metal structures, such as steel rods, are exposed to neutron radiation.

#### What form is it in?

Co-60 occurs as a solid material and might appear as small metal disks or in a tube, enclosed at both ends, that holds the small disks. Co-60 can occur as a powder if the solid sources have been ground or damaged.

#### What does it look like?

Co-60 is a hard, gray-blue metal. It resembles iron or nickel.

#### How can it hurt me?

Because it decays by gamma radiation, external exposure to large sources of Co-60 can cause skin burns, acute radiation sickness, or death. Most Co-60 that is ingested is excreted in the feces; however, a small amount is absorbed by the liver, kidneys, and bones. Co-60 absorbed by the liver, kidneys, or bone tissue can cause cancer because of exposure to the gamma radiation.

**Beta particles** are subatomic particles that are ejected from the nucleus of unstable atoms. Beta particles can travel through several layers of human skin, and exposure to large sources of beta radiation can cause burns or skin reddening. Beta particles that enter the body can damage cells, which may lead to cell death or, later in life, to cancer.

**Gamma radiation** is a packet of energy, called a photon, that is emitted from the nucleus of an unstable atom. Gamma radiation is high-energy electromagnetic radiation that can penetrate most substances (lead is the best barrier against gamma radiation). Because of its high energy, gamma radiation can penetrate the human body from the outside and damage cells, which could lead to cancer later in life.

## **Cobalt-60 (Co-60)**

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For more information about Co-60, see the Public Health Statement by the Agency for Toxic Substances and Disease Registry at <http://www.atsdr.cdc.gov/toxprofiles>, or visit the Environmental Protection Agency at <http://www.epa.gov/radiation/radionuclides/cobalt.htm>.

For more information about health effects related to uranium exposure, see CDC's fact sheet on "Radiation and Health Effects," at [www.bt.cdc.gov/radiation/healthfacts.asp](http://www.bt.cdc.gov/radiation/healthfacts.asp).

For more information on protecting yourself before or during a radiologic emergency, see CDC's fact sheet titled "Frequently Asked Questions (FAQs) About a Radiation Emergency" at [www.bt.cdc.gov/radiation/emergencyfaq.asp](http://www.bt.cdc.gov/radiation/emergencyfaq.asp), and "Sheltering in Place During a Radiation Emergency," at [www.bt.cdc.gov/radiation/shelter.asp](http://www.bt.cdc.gov/radiation/shelter.asp).

For information on other radiation emergency topics,  
visit [www.bt.cdc.gov/radiation](http://www.bt.cdc.gov/radiation), or call the CDC public response hotline  
at (888) 246-2675 (English), (888) 246-2857 (Español), or (866) 874-2646 (TTY)